PATENT ABSTRACTS OF JAPAN

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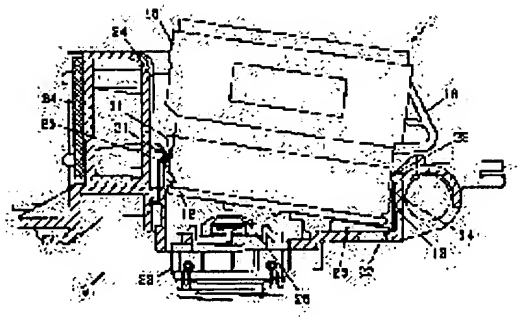
(54) INK TANK, INK JET RECORDING UNIT, AND INK JET RECORDER

(57)Abstract:
PROBLEM TO BE SOLVED: To provide an ink tank, an ink jet recording unit and an ink jet recorder in which the ink tank can be mounted/demounted smoothly and surely by preventing projection from the ink jet recording unit at the time of demounting.
SOLUTION: Under a state where an ink tank 1 is mounted on an ink jet recording unit 2, a reaction force generating member 28 pushes up the bottom face of the ink tank 1 constantly and the reaction force is received through engagement of a first protrusion 11 and a resilient member 21 and through abutting of the inclining face 14 of a protrusion 13 and a protrusion 23. When a user presses the ink tank 1 above the protrusion 13, ink tank 1 turns to disengage the resilient member 21 from the first protrusion 11 and the ink tank 1 begins to project from the ink jet recording unit 2. But the resilient member 21 engages a second protrusion 12 to stop the ink tank 1 thus preventing projection thereof.



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CLAIMS

[Claim(s)]

[Claim 1] The ink tank characterized by having the 1st height prepared in one side face, and the 2nd height arranged under this 1st height in the ink tank held free [attachment and detachment] to an ink jet record unit.

[Claim 2] The field by the side of the 1st [of said 2nd height / said] height is an ink tank according to claim 1 characterized by not being parallel to the base of an ink tank.

[Claim 3] The ink tank characterized by having the heights by which the slant face for a stop was established in one side face in the ink tank held free [attachment and detachment] to an ink jet record unit.

[Claim 4] In the ink jet record unit held for an ink tank according to claim 1 or 2, enabling free attachment and detachment The reaction force generating member which acts so that the maintenance condition of said ink tank may be opened in contact with the base of said ink tank, The ink jet record unit characterized by having the elastic member which is formed so that it may counter with the side face in which said the 1st height and said 2nd height of this ink tank were prepared in the condition of having been equipped with said ink tank, and engages with said 1st height or said 2nd height.

[Claim 5] Said ink tank is an ink jet record unit according to claim 4 characterized by serving as the liquid free passage member of the ink which has the feed hopper for supplying ink outside on the base, and said reaction force generating member combines with said feed hopper.

[Claim 6] The ink jet record unit according to claim 4 characterized by preparing two or more protection ribs in the side face in which said the 1st height and said 2nd height of this ink tank were prepared in the condition of having been equipped with said ink tank, and the field which counters at spacing narrower than the width of face of said ink tank at the both sides of said elastic member more widely than the width of face of said 1st height of said ink tank, and said 2nd height.

[Claim 7] The ink jet record unit with which the field which contacts said slant face established in said heights of said ink tank in the ink jet record unit held for an ink tank according to claim 3, enabling free attachment and detachment is characterized by having the lobe which consisted of curved surfaces.

[Claim 8] The ink jet record unit according to claim 7 characterized by having prepared the 1st rib which contacts the whole surface of said heights of said ink tank in the lower part of said lobe, and preparing the 2nd rib which contacts this, the side face in which said heights of said ink tank were prepared in the field which counters, and the side face of an opposite hand.

[Claim 9] An ink jet record unit given in claim 4 characterized by preparing the 3rd rib which inclined to the base of said ink tank when said ink jet record unit was equipped with said ink tank

thru/or any 1 term of 8.
[Claim 10] An ink jet record unit given in claim 4 characterized by preparing the 4th rib which contacts the side face in which it has the side face in which it has said heights of said ink tank or said 1st height, and said 2nd height, and the side face which intersects perpendicularly thru/or any 1 term of 9.
[Claim 11] the recording surface of a record medium -- meeting -- a round trip -- the ink jet recording apparatus characterized by having the ink jet record unit of a publication in claim 4 thru/or any 1 term of 10 in the ink jet recording apparatus which has the carriage supported movable.
[Claim 12] The ink jet recording device according to claim 11 characterized by uniting said ink jet record unit with said carriage.

DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Field of the Invention] This invention relates to the ink jet recording device equipped with the ink tank which holds the detailed ink for record, the ink jet record unit held for this ink tank, enabling free attachment and detachment, and this ink jet record unit about the recording device of the ink jet method which breathes out ink and records on a record medium.
[0002]
[Description of the Prior Art] As a means to position an ink tank free [attachment and detachment] to an ink jet record unit, the elastic member is prepared in the ink tank, the engagement part corresponding to this is prepared in an ink jet record unit, and discharge of engagement or engagement is made to perform attachment-and-detachment actuation of an ink tank for both in the conventional ink jet recording apparatus.
[0003] As a concrete Prior art, an ink tank is fixed by fitting of the latch pawl of the latch lever which has the elasticity prepared in the ink tank, and the engagement hole established in the ink jet record unit side, and removing an ink tank by discharge of a latch lever is known as shown in JP,8-58107,A.
[0004] However, in the attachment and detachment using this elastic member of an ink tank, the elastic force of an elastic member may work beyond the need in the case of removal of an ink tank, and, as a result, the ink tank might jump out according to elastic force from the ink jet record unit. After the further used ink tank jumped out from the ink jet record unit, the ink which was carrying out residual adhesion scattered near the ink feed hopper of an ink tank, and there was a problem of causing a user, contamination of a recording device and a record medium, etc.
[0005] Moreover, when making fitting of a latch pawl and an engagement hole perform, a latch lever is pushed at the time of wearing, the ink tank was rotated at it, but since the medial axis of the rotation at this time did not become settled and the position of the ink tank at the time of wearing was not stabilized, the problem of shifting delicately also had a stowed position.
[0006]
[Problem(s) to be Solved by the Invention] In case this invention was made in view of the situation mentioned above and removes an ink tank, it does not raise an ink tank superfluously, and it aims at offering the ink tank which can ensure [smoothly and] attachment and detachment of an ink tank, an ink jet record unit, and an ink jet recording device while it prevents that an ink tank jumps out of an ink jet record unit.

[0007]
[Means for Solving the Problem] Invention according to claim 1 is characterized by having the 1st height prepared in one side face, and the 2nd height arranged under this 1st height in the ink tank held free [attachment and detachment] to an ink jet record unit.
[0008] It is characterized by the field by the side of the 1st [of said 2nd height / said] height not being [invention according to claim 2] parallel to the base of an ink tank in an ink tank according to claim 1.
[0009] Invention according to claim 3 is characterized by having the heights by which the slant face for a stop was established in one side face in the ink tank held free [attachment and detachment] to an ink jet record unit.
[0010] In the ink jet record unit which holds invention according to claim 4 for an ink tank according to claim 1 or 2, enabling free attachment and detachment The reaction force generating member which acts so that the maintenance condition of said ink tank may be opened in contact with the base of said ink tank, It is characterized by having the elastic member which is formed so that it may counter with the side face in which said the 1st height and said 2nd height of this ink tank were prepared in the condition of having been equipped with said ink tank, and engages with said 1st height or said 2nd height.
[0011] Invention according to claim 5 is characterized by said ink tank serving as the liquid free passage member of the ink which has the feed hopper for supplying ink to a base outside, and said reaction force generating member combines with said feed hopper in an ink jet record unit according to claim 4.
[0012] Invention according to claim 6 is set to an ink jet record unit according to claim 4. To the side face in which said the 1st height and said 2nd height of this ink tank were prepared in the condition of having been equipped with said ink tank, and the field which counters More widely than the width of face of said 1st height of said ink tank, and said 2nd height, it is spacing narrower than the width of face of said ink tank, and is characterized by preparing two or more protection ribs in the both sides of said elastic member.
[0013] Invention according to claim 7 is characterized by having the lobe by which the field adjacent to said slant face established in said heights of said ink tank was constituted from a curved surface in the ink jet record unit held for an ink tank according to claim 3, enabling free attachment and detachment.
[0014] Invention according to claim 8 is characterized by preparing the 2nd rib which contacts the side face in which said heights of said ink tank were prepared in the field which prepares the 1st rib which contacts the whole surface of said heights of said ink tank in the lower part of said lobe, and counters it with this, and the side face of an opposite hand in an ink jet record unit according to claim 7.
[0015] In an ink jet record unit given in claim 4 thru/or any 1 term of 8, when invention according to claim 9 equips said ink jet record unit with said ink tank, it is characterized by preparing the 3rd rib which inclined to the base of said ink tank.
[0016] Invention according to claim 10 is characterized by preparing the 4th rib which contacts the side face in which it has the side face in which it has said heights of said ink tank or said 1st height, and said 2nd height, and the side face which intersects perpendicularly in an ink jet record unit given in claim 4 thru/or any 1 term of 9.
[0017] invention according to claim 11 -- the recording surface of a record medium -- meeting -- a round trip -- in the ink jet recording apparatus which has the carriage supported movable, it is characterized by having the ink jet record unit of a publication in claim 4 thru/or any 1 term of

10.
[0018] Invention according to claim 12 is characterized by uniting said ink jet record unit with said carriage in an ink jet recording apparatus according to claim 11.
[0019]
[Embodiment of the Invention] Drawing 1 is the side elevation showing one gestalt of operation of the ink tank of this invention. the inside of drawing, and 1 -- an ink tank and 11 -- the 1st height and 12 -- for a slant face and 15, as for a feed hopper and 17, the contact section and 16 are [the 2nd height and 13 / heights and 14 / a location regulation side and 18] handles.
[0020] The two-step projection which becomes a left lateral in drawing from the 1st height 11 and 2nd height 12 is prepared in the ink tank 1. The 1st height 11 and 2nd height 12 engage with the elastic member of the ink jet record unit mentioned later, respectively. The 1st height 11 engages with an elastic member in the condition of having been equipped with the ink tank 1, and maintains the wearing condition of the ink tank 1. Moreover, the 2nd height 12 is once engaged, in case the ink tank 1 is removed, and it prevents the elutriation of the ink tank 1. Since the 2nd height 12 engages with an elastic member in the state of the slant which is not thoroughly equipped with the ink tank 1 in this way, the upper part serves as a slant face. Moreover, by making an engagement side into a slant face, it is [the engagement section] slipping-easy, it is carried out, and it makes it possible to cancel engagement more smoothly.
[0021] Heights 13 are formed in the right lateral in drawing which is the opposite hand of a left lateral in which the 1st height 11 and 2nd height 12 were formed. Heights 13 are for contacting the rib prepared in the ink jet record unit later mentioned when equipped with the ink tank 1, and deciding the stowed position of the ink tank 1. Moreover, the slant face 14 is formed in the upper part. This slant face 14 and the lobe prepared in the ink jet record unit mentioned later contact, and it becomes a rotational medial axis at the time of wearing of the ink tank 1.
[0022] The contact section 15 is formed in the upper part of the 1st height 11 and the 2nd height 12. This contact section 15 is for contacting the rib prepared in the ink jet record unit later mentioned when equipped with the ink tank 1, and deciding the stowed position of the ink tank 1 with heights 13. A flat surface etc. is sufficient although formed in convex here.
[0023] The location regulation sides 17 are other two side faces which intersect perpendicularly with the side face in which the 1st height 11 and 2nd height 12 were prepared, and the side face in which heights 13 were formed, and are the field and the field of an opposite hand of the transverse plane in drawing 1 . This location regulation side 17 is used in order to position the direction of a front flesh side of space.
[0024] In addition, the feed hopper 16 for supplying ink to a recording head is formed in the base of the ink tank 1. Moreover, the handle 18 is formed in the side face in which heights 13 were formed so that conveniently [attachment and detachment of the ink tank 1].
[0025] Similarly a decomposition perspective view [in / in drawing 2 / one gestalt of operation of the ink jet record unit of this invention] and drawing 3 are sectional views. the inside of drawing, and 2 -- an ink jet record unit and 21 -- an elastic member and 22 -- the 1st rib and 23 -- a lobe and 24 -- the 2nd rib and 25 -- a protection rib and 26 -- the 3rd rib and 27 -- the 4th rib and 28 -- for a joint block and 33, as for a heat sink and 35, a manifold and 34 are [a reaction force generating member and 31 / a filter and 32 / a face shield and 36] printed circuit boards. Here, the configuration which can equip with two ink tanks is shown in the ink jet record unit 2. One ink tank shall hold only monochromatic ink, such as for example, black ink, another ink tank shall hold the ink of two or more colors, and it shall be equipped with the ink tank of 3 color one apparatus here. Of course, you may be the configuration equipped only with one ink tank,

and the configuration of being equipped with three or more ink tanks. About each ink tank with which it is equipped, it has the following configurations. Moreover, the number of the ink held in the ink tank with which it is equipped may be 1, not only 3 but 2, and 4 or more.
[0026] The 1st rib 22, a lobe 23, the 2nd rib 24, the protection rib 25, the 3rd rib 26, and the 4th rib 27 grade are formed in the ink jet record unit 2. The 1st rib 22 contacts the field of the heights 13 of the ink tank 1. Moreover, the 2nd rib 24 contacts the contact section 15 of the ink tank 1. This positions the ink tank 1 of the longitudinal direction in drawing 3 . A lobe 23 contacts the slant face 14 established in the upper part of the heights 13 of the ink tank 1. The contact side of a lobe 23 consists of curved surfaces, and contacts a slant face 14 and a line. Therefore, it becomes a rotation shaft at the time of equipping with the ink tank 1, and rotation of the smooth ink tank 1 is realized. Moreover, although the ink tank 1 has received the force of going to the upper part by the reaction force generating member 28 while being equipped with the ink tank 1, the wearing condition of the ink tank 1 is maintained by contact on the slant face 14 of this lobe 23 and the heights 13 of the ink tank 1, and the elastic member 21 mentioned later.
[0027] The 3rd rib 26 is formed in a base and the part which counters, when equipped with the ink tank 1, and it is aslant formed so that the 1st rib 22 side may become low, as shown in drawing 3 . Although the ink tank 1 is aslant inserted in case a user carries the ink tank 1, this 3rd rib 26 achieves the duty of the advice which keeps the condition across the ink tank 1 constant, and is reducing the danger of causing poor wearing of the ink tank by a backlash etc., in response to the effect by the attachment-and-detachment actuation condition of the ink tank 1 by the user. Moreover, in case the ink tank 1 is removed, by pushing in the side in which the handle 18 of the ink tank 1 is formed, the ink tank 1 can use the high part of the 3rd rib 26 as the supporting point, and can be rotated, and the 1st height of the ink tank 1 and a stop of an elastic member 21 can be canceled with the force to the upper part by the reaction force generating member 28.
[0028] When equipped with the ink tank 1, the 4th rib 27 contacts the location regulation side 17 of the ink tank 1, regulates the location of the ink tank 1, and prevents the backlash of the ink tank 1 to the ink jet record unit 2. Thereby, the free passage of the ink passage in a connection with the feed hopper 16 of the ink tank 1 can be ensured.
[0029] Moreover, corresponding to each ink tank 1, the elastic member 21 is formed in the ink jet record unit 2. The elastic member 21 is constituted so that it may engage with the 1st height 11 of the ink tank 1, or the 2nd height 12 by the point. In the condition of having been equipped with the ink tank 1, an elastic member 21 engages with the 1st height 11, and maintains the wearing condition of the ink tank 1 against the upward force which the ink tank 1 receives from the reaction force generating member 28 with a lobe 23. Moreover, in case the ink tank 1 is removed, by pushing in the side in which the heights 13 of the ink tank 1 are formed, the ink tank 1 uses the high part of the 3rd rib 26 as the supporting point, and rotates, and the 1st height of the ink tank 1 and a stop of an elastic member 21 cancel with the force to the upper part by the reaction force generating member 28. However, an elastic member 21 engages with the 2nd height 12 of the ink tank 1 according to the elastic force of an elastic member 21. By this, the elutriation of the ink tank 1 at the time of removing the ink tank 1 is prevented.
[0030] The protection rib 25 is larger than the width of face of the 1st height 11 of the ink tank 1, and the 2nd height 12 on both sides of an elastic member 21, is prepared in them two or more at spacing narrower than the width of face of the ink tank 1, and is prepared in them at the height more than an elastic member 21 and an EQC. It prevents that the base corner of the ink tank 1 contacts the direct elastic member 21 at the time of wearing of the ink tank 1, and generating of nonconformity, such as hooking an elastic member 21, and breaking and bending it by the

corner, is prevented.
[0031] The ink jet record unit 2 is equipped with the printed circuit board 36 grade for connecting electrically further the recording head section, the recording head section, and the body which are assemblies, such as a filter 31, the joint block 32, a manifold 33, a heat sink 34, and a face shield 35.
[0032] In the joint block 32, it has the ink induction for connecting with the ink tank 1 according to the color number of the ink held in the ink tank 1. The filter 31 and the reaction force generating member 28 are formed in each ink induction. It joins to the feed hopper 16 of the ink tank 1, and the reaction force generating member 28 forms the passage of ink. The reaction force generating member 28 can be formed with an elastic body. The field around the feed hopper 16 of the ink tank 1 contacts the reaction force generating member 28 by wearing of the ink tank 1, and it is pressed further, and the reaction force generating member 28 deforms and the sealed ink passage is constituted. After association, the reaction force generating member 28 pushes up the ink tank 1 upwards according to the elastic force, and it acts so that the maintenance condition of the ink tank 1 may be opened. Moreover, the filter 31 is formed in order not to make the dust which adheres where the ink tank 1 is removed mix in ink passage. Moreover, ink was held with the meniscus of the ink formed in the micropore of a filter 31, and runoff of the ink from the nozzle for carrying out the regurgitation of the ink prepared in the recording head is prevented.
[0033] The heights used as the crevice used as the ink passage for every ink of each color or a wall are formed in the manifold 33, it is joined to the joint block 32 and ink passage is formed. Moreover, the ink passage to a recording head is formed by connecting a recording head with a manifold 33. By these configurations, the ink introduced from ink induction is supplied to a recording head.
[0034] It is thermally joined by the heat sink 34 and a recording head misses to it the heat generated in a recording head. Moreover, wiring for supplying power and a control signal, the signal of the image which should be recorded, etc. to a recording head etc. is prepared in the front face of a heat sink 34. The actuation circuit for driving a heating element in accordance with the image to record etc. may be prepared. These wiring and recording heads on a heat sink 34 are electrically connected by wirebonding etc. Furthermore, in order to protect a recording head, a face shield 35 is attached.
[0035] The printed circuit board 36 is formed in order to relay the power from the body of an ink jet recording device, a control signal, a picture signal, etc. to wiring on each heat sink 34. It has the terminal for connecting with the connector for connecting with the body of an ink jet recording apparatus by the flexible cable, and wiring on each heat sink 34. Moreover, the control circuit for performing record control of a recording head may be arranged.
[0036] A printed circuit board 36 is attached in the ink jet record unit 2, and each recording head section is further attached in it. The ink jet record unit 2 shown here is used also [carriage / of an ink jet recording apparatus], and moves along with the guide bar which is not illustrated in a recorded-media top. Or you may be the configuration of equipping the carriage of another object with the ink jet record unit 2. Moreover, the recording head section can be constituted free [attachment and detachment].
[0037] Drawing 4 is the sectional view showing an example of the condition before being equipped with an ink tank to the ink jet record unit of this invention, and the sectional view and drawing 6 which show an example in the condition of drawing 5 being the same and having been equipped with the ink tank are the sectional view showing an example of the medium stop condition at the time of similarly removing an ink tank. In case a user is going to equip the ink

jet record unit 2 with the ink tank 1, a heights 13 side is lowered and the ink tank 1 is dropped, as shown in drawing 4 . At this time, the lower part of the side in which the 1st height 11 and 2nd height 12 of the ink tank 1 are prepared collides with the 2nd rib 24 and protection rib 25 grade, and, as for the ink tank 1, the trespass direction is regulated to a handle 18 side. Moreover, the part by the side of the handle 18 of the base of the ink tank 1 contacts the 3rd rib 26, and the ink tank 1 slides into a handle 18 side along the dip of the 3rd rib 26. Thereby, the heights 13 of the ink tank 1 are hidden under a lobe 23.

[0038] As shown in drawing 4 , after dropping the ink tank 1, a user pushes in an opposite hand in the handle 18 of the ink tank 1. Thereby, an elastic member 21 slides on the side face in which these are prepared in order of the 2nd height 12 of the ink tank 1, and the 1st height 11. Since the elastic member 21 is protected by the protection rib 25 at this time, it is caught in the base of the ink tank 1, and does not damage. Moreover, the lower part of the 1st height 11 and the 2nd height 12 has the gently-sloping inclined plane so that sliding of an elastic member 21 may be performed good. On the other hand, as for the location of the ink tank 1 of the direction of a front flesh side of the space in drawing 4 , positioning is made by contact to the location regulation side 17 of the ink tank 1, and the 4th rib 27.

[0039] If the ink tank 1 is pushed in and it dies, the perimeter of the feed hopper 16 of the base of the ink tank 1 will contact the reaction force generating member 28, if it pushes in further, while the reaction force generating member 28 will carry out elastic deformation, it sticks to the perimeter of a feed hopper 16, and the passage of ink is formed. Moreover, the ink tank 1 comes to receive the force of the sense pushed up upwards according to the elastic force with the elastic deformation of the reaction force generating member 28. Although the side in which the 1st height 11 and 2nd height 12 of the ink tank 1 are prepared is now pressed by the user, since the force is not applied, in the side in which the handle 18 of the ink tank 1 is formed, the side here is pushed up upwards by the force by the reaction force generating member 28. The slant face 14 of the upper part of heights 13 and the curved surface of a lobe 23 contact a line by this. Henceforth, this linear contact section takes the lead in rotation of the ink tank 1. Since it is in contact with the line, rotation of the future ink tanks 1 is smooth.

[0040] If the ink tank 1 is furthermore pushed in, an elastic member 21 and the 1st height 11 will be engaged, and the ink tank 1 will be held in the wearing condition in response to the force to the upper part by the reaction force generating member 28 by the contact to this engagement section, and the slant face 14 of heights 13 and a lobe 23. Moreover, the 2nd rib 24 contacts the contact section 15, heights 13 are further contacted in the 1st rib 22, and positioning of the longitudinal direction in drawing 5 is made. Thus, as shown in drawing 5 , the ink jet record unit 2 is equipped with the ink tank 1. By wearing of the ink tank 1, the reaction force generating member 28 is stuck to the base of the ink tank 1, and leads ink to the recording head of the ink jet record unit 2 through the reaction force generating member 28 from the feed hopper 16 of the ink tank 1.

[0041] In case the ink tank 1 is removed, the handle 18 side of the ink tank 1 is depressed. Then, while the base of the ink tank 1 contacts the high part of the 3rd rib 26, the contact section is rotated as a shaft, and it is canceled in engagement to an elastic member 21 and the 1st height 11. Then, the side in which the 1st height 11 and 2nd height 12 of the ink tank 1 are prepared is pushed up by the elastic force of the reaction force generating member 28. After engagement to the 1st height 11 is canceled, an elastic member 21 slides along the field of the ink tank 1 according to the elastic force, and contacts the 2nd height 12. The top face of the 2nd height 12 is formed aslant, and after the ink tank 1 has rotated aslant, it engages with an elastic member 21.

By this engagement, the ink tank 1 which is going to jump out of the ink jet record unit 2 stops. Therefore, the ink tank 1 does not jump out according to the elastic force of the reaction force generating member 28. The intermediate state which an elastic member 21 and the 2nd height 12 were engaged, and the ink tank 1 stopped is shown in drawing 6 .

[0042] After an elastic member 21 and the 2nd height 12 are engaged and the ink tank 1 stops, when a user lifts the ink tank 1, engagement of an elastic member 21 and the 2nd height 12 is canceled, and can remove the ink tank 1. Since the engagement side of the 2nd height 12 consists of slant faces, it is easy to slide on the engagement section of an elastic member 21 and the 2nd height 12, and it can cancel engagement smoothly.

[0043] Each above-mentioned rib may be formed as the height which has the crowning of the shape not only of this but a field, although the drawing showed as the height which all has a linear crowning.

[0044]

[Effect of the Invention] According to this invention, the two-step projection which becomes an ink tank from the 1st height and 2nd height like invention according to claim 1 is prepared so that clearly from the above explanation. Like invention according to claim 4 An ink tank is held in two steps, and that maintenance condition is made to cancel in two steps by countering this the 1st height and 2nd height, preparing an elastic member in an ink jet record unit, and engaging with the 1st height or the 2nd height. It stops without raising an ink tank superfluously according to the operation by the reaction force generating member by this, in case an ink tank is removed, and can avoid making an ink tank jump out of an ink jet record unit.

[0045] In addition, it becomes possible like invention according to claim 2 for the engagement section with the elastic member of an ink jet record unit to slipping-come to be easy, and to cancel engagement smoothly by constituting the field by the side of the 1st [of the 2nd height] height from a slant face which is not parallel to the base of an ink tank. Moreover, it becomes possible simultaneously like invention according to claim 5 to carry out the liquid free passage of the feed hopper side of an ink tank and the recording head side at the time of wearing of an ink tank by few members by making a reaction force generating member serve as the free passage member of the ink for record. Furthermore, destruction of the elastic member by the base of an ink tank can be prevented like invention according to claim 6 by having prepared two or more protection ribs in the both sides of an elastic member.

[0046] The contact section becomes straight line-like by forming the heights which established the slant face for a stop in the ink tank side, and on the other hand, constituting lobe **** and the contact side of a lobe which contact on the slant face of the heights of an ink tank at an ink jet record unit side from a curved surface like invention according to claim 7 like invention according to claim 3. Therefore, in the case of attachment and detachment of an ink tank, an ink tank can be smoothly rotated centering on the straight line of this contact section, and attachment and detachment become easy. Like invention according to claim 8, moreover, to an ink jet record unit By preparing the 1st rib which contacts the heights of an ink tank, and preparing the 2nd rib which contacts this, the side face in which said heights of said ink tank were prepared in the field which counters, and the side face of an opposite hand An ink tank is positioned between the 1st rib and the 2nd rib. It becomes possible to prevent the backlash of the ink tank to the ink jet record unit after ink tank wearing, and connection of the ink passage in the feed hopper part of ink can be ensured as a result.

[0047] According to invention according to claim 9, by having prepared the 3rd rib which inclined to the base of an ink tank, the duty of the advice which keeps constant the condition

across the ink tank which will be in a slanting condition temporarily in the case of attachment and detachment can be achieved, and the danger cause poor wearing of the ink tank by a backlash etc. in response to the effect by a user's attachment and detachment actuation condition can be reduced.

[0048] Since the 4th rib which contacts the side face in which it has the side face or the 1st height, and the 2nd height which have the heights of an ink tank, and the side face which intersects perpendicularly was prepared according to invention according to claim 10 It becomes possible to prevent the backlash of the ink tank to the ink jet record unit after ink tank wearing in the 4th [this] direction between ribs, and connection of the ink passage in the feed hopper part of ink can be ensured as a result.

[0049] According to invention according to claim 11, the ink jet recording apparatus which has the ink jet record unit of a publication in claim 4 thru/or any 1 term of 10 can be obtained, and the configuration of an ink jet recording apparatus can be simplified by uniting an ink jet record unit with carriage like especially invention according to claim 12.

TECHNICAL FIELD

[Field of the Invention] This invention relates to the ink jet recording device equipped with the ink tank which holds the detailed ink for record, the ink jet record unit held for this ink tank, enabling free attachment and detachment, and this ink jet record unit about the recording device of the ink jet method which breathes out ink and records on a record medium.

PRIOR ART

[Description of the Prior Art] As a means to position an ink tank free [attachment and detachment] to an ink jet record unit, the elastic member is prepared in the ink tank, the engagement part corresponding to this is prepared in an ink jet record unit, and discharge of engagement or engagement is made to perform attachment-and-detachment actuation of an ink tank for both in the conventional ink jet recording apparatus.

[0003] As a concrete Prior art, an ink tank is fixed by fitting of the latch pawl of the latch lever which has the elasticity prepared in the ink tank, and the engagement hole established in the ink jet record unit side, and removing an ink tank by discharge of a latch lever is known as shown in JP,8-58107,A.

[0004] However, in the attachment and detachment using this elastic member of an ink tank, the elastic force of an elastic member may work beyond the need in the case of removal of an ink tank, and, as a result, the ink tank might jump out according to elastic force from the ink jet record unit. After the further used ink tank jumped out from the ink jet record unit, the ink which was carrying out residual adhesion scattered near the ink feed hopper of an ink tank, and there was a problem of causing a user, contamination of a recording device and a record medium, etc.

[0005] Moreover, when making fitting of a latch pawl and an engagement hole perform, a latch lever is pushed at the time of wearing, the ink tank was rotated at it, but since the medial axis of the rotation at this time did not become settled and the position of the ink tank at the time of wearing was not stabilized, the problem of shifting delicately also had a stowed position.

EFFECT OF THE INVENTION

[Effect of the Invention] According to this invention, the two-step projection which becomes an ink tank from the 1st height and 2nd height like invention according to claim 1 is prepared, like invention according to claim 4, this the 1st height and 2nd height are countered, an elastic member is prepared in an ink jet record unit, and it engages with the 1st height or the 2nd height so that clearly from the above explanation. An ink tank is held in two steps, and the maintenance condition is made to cancel in two steps. It stops without raising an ink tank superfluously according to the operation by the reaction force generating member by this, in case an ink tank is removed, and can avoid making an ink tank jump out of an ink jet record unit.
[0045] In addition, it becomes possible like invention according to claim 2 for the engagement section with the elastic member of an ink jet record unit to slipping-come to be easy, and to cancel engagement smoothly by constituting the field by the side of the 1st [of the 2nd height] height from a slant face which is not parallel to the base of an ink tank. Moreover, it becomes possible simultaneously like invention according to claim 5 to carry out the liquid free passage of the feed hopper side of an ink tank and the recording head side at the time of wearing of an ink tank by few members by making a reaction force generating member serve as the free passage member of the ink for record. Furthermore, destruction of the elastic member by the base of an ink tank can be prevented like invention according to claim 6 by having prepared two or more protection ribs in the both sides of an elastic member.
[0046] The contact section becomes straight line-like by forming the heights which established the slant face for a stop in the ink tank side, and on the other hand, constituting lobe **** and the contact side of a lobe which contact on the slant face of the heights of an ink tank at an ink jet record unit side from a curved surface like invention according to claim 7 like invention according to claim 3. Therefore, in the case of attachment and detachment of an ink tank, an ink tank can be smoothly rotated centering on the straight line of this contact section, and attachment and detachment become easy. Moreover, the thing which the 1st rib which contacts an ink jet record unit with the heights of an ink tank is prepared, and is established for the 2nd rib which contacts this, the side face in which said heights of said ink tank were prepared in the field which counters, and the side face of an opposite hand like invention according to claim 8 An ink tank is positioned between the 1st rib and the 2nd rib, it becomes possible to prevent the backlash of the ink tank to the ink jet record unit after ink tank wearing, and connection of the ink passage in the feed hopper part of ink can be ensured as a result.
[0047] According to invention according to claim 9, by having prepared the 3rd rib which inclined to the base of an ink tank, the duty of the advice which keeps constant the condition across the ink tank which will be in a slanting condition temporarily in the case of attachment and detachment can be achieved, and the danger cause poor wearing of the ink tank by a backlash etc. in response to the effect by a user's attachment and detachment actuation condition can be reduced.
[0048] Since the 4th rib which contacts the side face in which it has the side face or the 1st height, and the 2nd height which have the heights of an ink tank, and the side face which intersects perpendicularly was prepared according to invention according to claim 10, It becomes possible to prevent the backlash of the ink tank to the ink jet record unit after ink tank wearing in the 4th [this] direction between ribs, and connection of the ink passage in the feed hopper part of ink can be ensured as a result.
[0049] According to invention according to claim 11, the ink jet recording apparatus which has the ink jet record unit of a publication in claim 4 thru/or any 1 term of 10 can be obtained, and

the configuration of an ink jet recording apparatus can be simplified by uniting an ink jet record unit with carriage like especially invention according to claim 12.

TECHNICAL PROBLEM

[Problem(s) to be Solved by the Invention] In case this invention was made in view of the situation mentioned above and removes an ink tank, it does not raise an ink tank superfluously, and it aims at offering the ink tank which can ensure [smoothly and] attachment and detachment of an ink tank, an ink jet record unit, and an ink jet recording device while it prevents that an ink tank jumps out of an ink jet record unit.

MEANS

[Means for Solving the Problem] Invention according to claim 1 is characterized by having the 1st height prepared in one side face, and the 2nd height arranged under this 1st height in the ink tank held free [attachment and detachment] to an ink jet record unit.

[0008] It is characterized by the field by the side of the 1st [of said 2nd height / said] height not being [invention according to claim 2] parallel to the base of an ink tank in an ink tank according to claim 1.

[0009] Invention according to claim 3 is characterized by having the heights by which the slant face for a stop was established in one side face in the ink tank held free [attachment and detachment] to an ink jet record unit.

[0010] In the ink jet record unit which holds invention according to claim 4 for an ink tank according to claim 1 or 2, enabling free attachment and detachment The reaction force generating member which acts so that the maintenance condition of said ink tank may be opened in contact with the base of said ink tank, It is characterized by having the elastic member which is formed so that it may counter with the side face in which said the 1st height and said 2nd height of this ink tank were prepared in the condition of having been equipped with said ink tank, and engages with said 1st height or said 2nd height.

[0011] Invention according to claim 5 is characterized by said ink tank serving as the liquid free passage member of the ink which has the feed hopper for supplying ink to a base outside, and said reaction force generating member combines with said feed hopper in an ink jet record unit according to claim 4.

[0012] Invention according to claim 6 is set to an ink jet record unit according to claim 4. To the side face in which said the 1st height and said 2nd height of this ink tank were prepared in the condition of having been equipped with said ink tank, and the field which counters More widely than the width of face of said 1st height of said ink tank, and said 2nd height, it is spacing narrower than the width of face of said ink tank, and is characterized by preparing two or more protection ribs in the both sides of said elastic member.

[0013] Invention according to claim 7 is characterized by having the lobe by which the field adjacent to said slant face established in said heights of said ink tank was constituted from a curved surface in the ink jet record unit held for an ink tank according to claim 3, enabling free attachment and detachment.

[0014] Invention according to claim 8 is characterized by preparing the 2nd rib which contacts the side face in which said heights of said ink tank were prepared in the field which prepares the 1st rib which contacts the whole surface of said heights of said ink tank in the lower part of said

lobe, and counters it with this, and the side face of an opposite hand in an ink jet record unit according to claim 7.
[0015] In an ink jet record unit given in claim 4 thru/or any 1 term of 8, when invention according to claim 9 equips said ink jet record unit with said ink tank, it is characterized by preparing the 3rd rib which inclined to the base of said ink tank.
[0016] Invention according to claim 10 is characterized by preparing the 4th rib which contacts the side face in which it has the side face in which it has said heights of said ink tank or said 1st height, and said 2nd height, and the side face which intersects perpendicularly in an ink jet record unit given in claim 4 thru/or any 1 term of 9.
[0017] invention according to claim 11 -- the recording surface of a record medium -- meeting -- a round trip -- in the ink jet recording apparatus which has the carriage supported movable, it is characterized by having the ink jet record unit of a publication in claim 4 thru/or any 1 term of 10.
[0018] Invention according to claim 12 is characterized by uniting said ink jet record unit with said carriage in an ink jet recording apparatus according to claim 11.
[0019]
[Embodiment of the Invention] Drawing 1 is the side elevation showing one gestalt of operation of the ink tank of this invention. the inside of drawing, and 1 -- an ink tank and 11 -- the 1st height and 12 -- for a slant face and 15, as for a feed hopper and 17, the contact section and 16 are [the 2nd height and 13 / heights and 14 / a location regulation side and 18] handles.
[0020] The two-step projection which becomes a left lateral in drawing from the 1st height 11 and 2nd height 12 is prepared in the ink tank 1. The 1st height 11 and 2nd height 12 engage with the elastic member of the ink jet record unit mentioned later, respectively. The 1st height 11 engages with an elastic member in the condition of having been equipped with the ink tank 1, and maintains the wearing condition of the ink tank 1. Moreover, the 2nd height 12 is once engaged, in case the ink tank 1 is removed, and it prevents the elutriation of the ink tank 1. Since the 2nd height 12 engages with an elastic member in the state of the slant which is not thoroughly equipped with the ink tank 1 in this way, the upper part serves as a slant face. Moreover, by making an engagement side into a slant face, it is [the engagement section] slipping-easy, it is carried out, and it makes it possible to cancel engagement more smoothly.
[0021] Heights 13 are formed in the right lateral in drawing which is the opposite hand of a left lateral in which the 1st height 11 and 2nd height 12 were formed. Heights 13 are for contacting the rib prepared in the ink jet record unit later mentioned when equipped with the ink tank 1, and deciding the stowed position of the ink tank 1. Moreover, the slant face 14 is formed in the upper part. This slant face 14 and the lobe prepared in the ink jet record unit mentioned later contact, and it becomes a rotational medial axis at the time of wearing of the ink tank 1.
[0022] The contact section 15 is formed in the upper part of the 1st height 11 and the 2nd height 12. This contact section 15 is for contacting the rib prepared in the ink jet record unit later mentioned when equipped with the ink tank 1, and deciding the stowed position of the ink tank 1 with heights 13. A flat surface etc. is sufficient although formed in convex here.
[0023] The location regulation sides 17 are other two side faces which intersect perpendicularly with the side face in which the 1st height 11 and 2nd height 12 were prepared, and the side face in which heights 13 were formed, and are the field and the field of an opposite hand of the transverse plane in drawing 1 . This location regulation side 17 is used in order to position the direction of a front flesh side of space.
[0024] In addition, the feed hopper 16 for supplying ink to a recording head is formed in the base

of the ink tank 1. Moreover, the handle 18 is formed in the side face in which heights 13 were formed so that conveniently [attachment and detachment of the ink tank 1].
[0025] Similarly a decomposition perspective view [in / in drawing 2 / one gestalt of operation of the ink jet record unit of this invention] and drawing 3 are sectional views. the inside of drawing, and 2 -- an ink jet record unit and 21 -- an elastic member and 22 -- the 1st rib and 23 -- a lobe and 24 -- the 2nd rib and 25 -- a protection rib and 26 -- the 3rd rib and 27 -- the 4th rib and 28 -- for a joint block and 33, as for a heat sink and 35, a manifold and 34 are [a reaction force generating member and 31 / a filter and 32 / a face shield and 36] printed circuit boards. Here, the configuration which can equip with two ink tanks is shown in the ink jet record unit 2. One ink tank shall hold only monochromatic ink, such as for example, black ink, another ink tank shall hold the ink of two or more colors, and it shall be equipped with the ink tank of 3 color one apparatus here. Of course, you may be the configuration equipped only with one ink tank, and the configuration of being equipped with three or more ink tanks. About each ink tank with which it is equipped, it has the following configurations. Moreover, the number of the ink held in the ink tank with which it is equipped may be 1, not only 3 but 2, and 4 or more.
[0026] The 1st rib 22, a lobe 23, the 2nd rib 24, the protection rib 25, the 3rd rib 26, and the 4th rib 27 grade are formed in the ink jet record unit 2. The 1st rib 22 contacts the field of the heights 13 of the ink tank 1. Moreover, the 2nd rib 24 contacts the contact section 15 of the ink tank 1. This positions the ink tank 1 of the longitudinal direction in drawing 3 . A lobe 23 contacts the slant face 14 established in the upper part of the heights 13 of the ink tank 1. The contact side of a lobe 23 consists of curved surfaces, and contacts a slant face 14 and a line. Therefore, it becomes a rotation shaft at the time of equipping with the ink tank 1, and rotation of the smooth ink tank 1 is realized. Moreover, although the ink tank 1 has received the force of going to the upper part by the reaction force generating member 28 while being equipped with the ink tank 1, the wearing condition of the ink tank 1 is maintained by contact on the slant face 14 of this lobe 23 and the heights 13 of the ink tank 1, and the elastic member 21 mentioned later.
[0027] The 3rd rib 26 is formed in a base and the part which counters, when equipped with the ink tank 1, and it is aslant formed so that the 1st rib 22 side may become low, as shown in drawing 3 . Although the ink tank 1 is aslant inserted in case a user carries the ink tank 1, this 3rd rib 26 achieves the duty of the advice which keeps the condition across the ink tank 1 constant, and is reducing the danger of causing poor wearing of the ink tank by a backlash etc., in response to the effect by the attachment-and-detachment actuation condition of the ink tank 1 by the user. Moreover, in case the ink tank 1 is removed, by pushing in the side in which the handle 18 of the ink tank 1 is formed, the ink tank 1 can use the high part of the 3rd rib 26 as the supporting point, and can be rotated, and the 1st height of the ink tank 1 and a stop of an elastic member 21 can be canceled with the force to the upper part by the reaction force generating member 28.
[0028] When equipped with the ink tank 1, the 4th rib 27 contacts the location regulation side 17 of the ink tank 1, regulates the location of the ink tank 1, and prevents the backlash of the ink tank 1 to the ink jet record unit 2. Thereby, the free passage of the ink passage in a connection with the feed hopper 16 of the ink tank 1 can be ensured.
[0029] Moreover, corresponding to each ink tank 1, the elastic member 21 is formed in the ink jet record unit 2. The elastic member 21 is constituted so that it may engage with the 1st height 11 of the ink tank 1, or the 2nd height 12 by the point. In the condition of having been equipped with the ink tank 1, an elastic member 21 engages with the 1st height 11, and maintains the wearing condition of the ink tank 1 against the upward force which the ink tank 1 receives from the reaction force generating member 28 with a lobe 23. Moreover, in case the ink tank 1 is

removed, by pushing in the side in which the heights 13 of the ink tank 1 are formed, the ink tank 1 uses the high part of the 3rd rib 26 as the supporting point, and rotates, and the 1st height of the ink tank 1 and a stop of an elastic member 21 cancel with the force to the upper part by the reaction force generating member 28. However, an elastic member 21 engages with the 2nd height 12 of the ink tank 1 according to the elastic force of an elastic member 21. By this, the elutriation of the ink tank 1 at the time of removing the ink tank 1 is prevented.

[0030] The protection rib 25 is larger than the width of face of the 1st height 11 of the ink tank 1, and the 2nd height 12 on both sides of an elastic member 21, is prepared in them two or more at spacing narrower than the width of face of the ink tank 1, and is prepared in them at the height more than an elastic member 21 and an EQC. It prevents that the base corner of the ink tank 1 contacts the direct elastic member 21 at the time of wearing of the ink tank 1, and generating of nonconformity, such as hooking an elastic member 21, and breaking and bending it by the corner, is prevented.

[0031] The ink jet record unit 2 is equipped with the printed circuit board 36 grade for connecting electrically further the recording head section, the recording head section, and the body which are assemblies, such as a filter 31, the joint block 32, a manifold 33, a heat sink 34, and a face shield 35.

[0032] In the joint block 32, it has the ink induction for connecting with the ink tank 1 according to the color number of the ink held in the ink tank 1. The filter 31 and the reaction force generating member 28 are formed in each ink induction. It joins to the feed hopper 16 of the ink tank 1, and the reaction force generating member 28 forms the passage of ink. The reaction force generating member 28 can be formed with an elastic body. The field around the feed hopper 16 of the ink tank 1 contacts the reaction force generating member 28 by wearing of the ink tank 1, and it is pressed further, and the reaction force generating member 28 deforms and the sealed ink passage is constituted. After association, the reaction force generating member 28 pushes up the ink tank 1 upwards according to the elastic force, and it acts so that the maintenance condition of the ink tank 1 may be opened. Moreover, the filter 31 is formed in order not to make the dust which adheres where the ink tank 1 is removed mix in ink passage. Moreover, ink was held with the meniscus of the ink formed in the micropore of a filter 31, and runoff of the ink from the nozzle for carrying out the regurgitation of the ink prepared in the recording head is prevented.

[0033] The heights used as the crevice used as the ink passage for every ink of each color or a wall are formed in the manifold 33, it is joined to the joint block 32 and ink passage is formed. Moreover, the ink passage to a recording head is formed by connecting a recording head with a manifold 33. By these configurations, the ink introduced from ink induction is supplied to a recording head.

[0034] It is thermally joined by the heat sink 34 and a recording head misses to it the heat generated in a recording head. Moreover, wiring for supplying power and a control signal, the signal of the image which should be recorded, etc. to a recording head etc. is prepared in the front face of a heat sink 34. The actuation circuit for driving a heating element in accordance with the image to record etc. may be prepared. These wiring and recording heads on a heat sink 34 are electrically connected by wirebonding etc. Furthermore, in order to protect a recording head, a face shield 35 is attached.

[0035] The printed circuit board 36 is formed in order to relay the power from the body of an ink jet recording device, a control signal, a picture signal, etc. to wiring on each heat sink 34. It has the terminal for connecting with the connector for connecting with the body of an ink jet recording apparatus by the flexible cable, and wiring on each heat sink 34. Moreover, the control

circuit for performing record control of a recording head may be arranged.
[0036] A printed circuit board 36 is attached in the ink jet record unit 2, and each recording head section is further attached in it. The ink jet record unit 2 shown here is used also [carriage / of an ink jet recording apparatus], and moves along with the guide bar which is not illustrated in a recorded-media top. Or you may be the configuration of equipping the carriage of another object with the ink jet record unit 2. Moreover, the recording head section can be constituted free [attachment and detachment].
[0037] Drawing 4 is the sectional view showing an example of the condition before being equipped with an ink tank to the ink jet record unit of this invention, and the sectional view and drawing 6 which show an example in the condition of drawing 5 being the same and having been equipped with the ink tank are the sectional view showing an example of the medium stop condition at the time of similarly removing an ink tank. In case a user is going to equip the ink jet record unit 2 with the ink tank 1, a heights 13 side is lowered and the ink tank 1 is dropped, as shown in drawing 4 . At this time, the lower part of the side in which the 1st height 11 and 2nd height 12 of the ink tank 1 are prepared collides with the 2nd rib 24 and protection rib 25 grade, and, as for the ink tank 1, the trespass direction is regulated to a handle 18 side. Moreover, the part by the side of the handle 18 of the base of the ink tank 1 contacts the 3rd rib 26, and the ink tank 1 slides into a handle 18 side along the dip of the 3rd rib 26. Thereby, the heights 13 of the ink tank 1 are hidden under a lobe 23.
[0038] As shown in drawing 4 , after dropping the ink tank 1, a user pushes in an opposite hand in the handle 18 of the ink tank 1. Thereby, an elastic member 21 slides on the side face in which these are prepared in order of the 2nd height 12 of the ink tank 1, and the 1st height 11. Since the elastic member 21 is protected by the protection rib 25 at this time, it is caught in the base of the ink tank 1, and does not damage. Moreover, the lower part of the 1st height 11 and the 2nd height 12 has the gently-sloping inclined plane so that sliding of an elastic member 21 may be performed good. On the other hand, as for the location of the ink tank 1 of the direction of a front flesh side of the space in drawing 4 , positioning is made by contact to the location regulation side 17 of the ink tank 1, and the 4th rib 27.
[0039] If the ink tank 1 is pushed in and it dies, the perimeter of the feed hopper 16 of the base of the ink tank 1 will contact the reaction force generating member 28, if it pushes in further, while the reaction force generating member 28 will carry out elastic deformation, it sticks to the perimeter of a feed hopper 16, and the passage of ink is formed. Moreover, the ink tank 1 comes to receive the force of the sense pushed up upwards according to the elastic force with the elastic deformation of the reaction force generating member 28. Although the side in which the 1st height 11 and 2nd height 12 of the ink tank 1 are prepared is now pressed by the user, since the force is not applied, in the side in which the handle 18 of the ink tank 1 is formed, the side here is pushed up upwards by the force by the reaction force generating member 28. The slant face 14 of the upper part of heights 13 and the curved surface of a lobe 23 contact a line by this.
Henceforth, this linear contact section takes the lead in rotation of the ink tank 1. Since it is in contact with the line, rotation of the future ink tanks 1 is smooth.
[0040] If the ink tank 1 is furthermore pushed in, an elastic member 21 and the 1st height 11 will be engaged, and the ink tank 1 will be held in the wearing condition in response to the force to the upper part by the reaction force generating member 28 by the contact to this engagement section, and the slant face 14 of heights 13 and a lobe 23. Moreover, the 2nd rib 24 contacts the contact section 15, heights 13 are further contacted in the 1st rib 22, and positioning of the longitudinal direction in drawing 5 is made. Thus, as shown in drawing 5 , the ink jet record unit

2 is equipped with the ink tank 1. By wearing of the ink tank 1, the reaction force generating member 28 is stuck to the base of the ink tank 1, and leads ink to the recording head of the ink jet record unit 2 through the reaction force generating member 28 from the feed hopper 16 of the ink tank 1.

[0041] In case the ink tank 1 is removed, the handle 18 side of the ink tank 1 is depressed. Then, while the base of the ink tank 1 contacts the high part of the 3rd rib 26, the contact section is rotated as a shaft, and it is canceled in engagement to an elastic member 21 and the 1st height 11. Then, the side in which the 1st height 11 and 2nd height 12 of the ink tank 1 are prepared is pushed up by the elastic force of the reaction force generating member 28. After engagement to the 1st height 11 is canceled, an elastic member 21 slides along the field of the ink tank 1 according to the elastic force, and contacts the 2nd height 12. The top face of the 2nd height 12 is formed aslant, and after the ink tank 1 has rotated aslant, it engages with an elastic member 21. By this engagement, the ink tank 1 which is going to jump out of the ink jet record unit 2 stops. Therefore, the ink tank 1 does not jump out according to the elastic force of the reaction force generating member 28. The intermediate state which an elastic member 21 and the 2nd height 12 were engaged, and the ink tank 1 stopped is shown in drawing 6 .

[0042] After an elastic member 21 and the 2nd height 12 are engaged and the ink tank 1 stops, when a user lifts the ink tank 1, engagement of an elastic member 21 and the 2nd height 12 is canceled, and can remove the ink tank 1. Since the engagement side of the 2nd height 12 consists of slant faces, it is easy to slide on the engagement section of an elastic member 21 and the 2nd height 12, and it can cancel engagement smoothly.

[0043] Each above-mentioned rib may be formed as the height which has the crowning of the shape not only of this but a field, although the drawing showed as the height which all has a linear crowning.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] It is the side elevation showing one gestalt of operation of the ink tank of this invention.

[Drawing 2] It is a decomposition perspective view in one gestalt of operation of the ink jet record unit of this invention.

[Drawing 3] It is a sectional view in one gestalt of operation of the ink jet record unit of this invention.

[Drawing 4] It is the sectional view showing an example of the condition before being equipped with an ink tank to the ink jet record unit of this invention.

[Drawing 5] It is the sectional view showing an example in the condition of having been equipped with the ink tank to the ink jet record unit of this invention.

[Drawing 6] It is the sectional view showing an example of the medium stop condition at the time of removing an ink tank from the ink jet record unit of this invention.

[Description of Notations]

1 -- An ink tank, 2 -- An ink jet record unit, 11 -- The 1st height, 12 [-- The contact section, 16 / -- Feed hopper,] -- The 2nd height, 13 -- Heights, 14 -- A slant face, 15 17 [-- The 1st rib,] -- A location regulation side, 18 -- A handle, 21 -- An elastic member, 22 23 [-- The 3rd rib, 27 / -- The 4th rib, 28 / -- A reaction force generating member, 31 / -- A filter, 32 / -- A joint block, 33 /

-- A manifold, 34 / -- A heat sink, 35 / -- A face shield, 36 / -- Printed circuit board.] -- A lobe, 24 -- The 2nd rib, 25 -- A protection rib, 26

[Translation done.]

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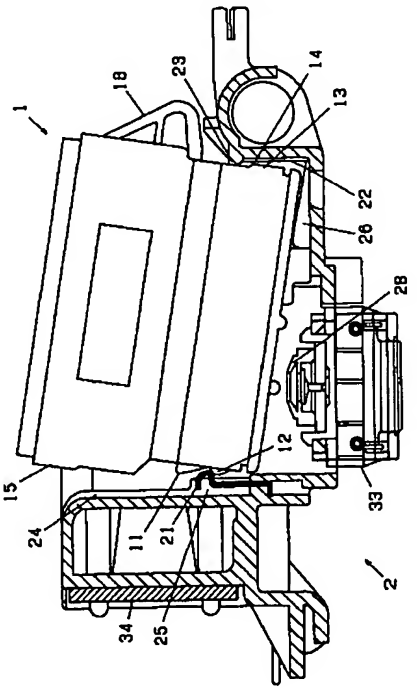
(54)【発明の名称】　インクタンク、インクジェット記録ユニット、およびインクジェット記録装置

(57)【要約】

【課題】　インクタンクを取り外す際にインクジェット記録ユニットからのインクタンクの飛び出しを防止し、インクタンクの着脱を円滑確実に行なうことのできるインクタンク、インクジェット記録ユニット、インクジェット記録装置を提供する。

【解決手段】　インクタンク１がインクジェット記録ユニット２に装着された状態で、反力発生部材２８がインクタンク１の底面を常時押し上げており、この力を第１の突起部１１と弾性部材２１の係合、および、凸部１３の斜面１４と突出部２３の当接で受けている。インクタンク１を凸部１３の上方でユーザが押圧すると、インクタンク１は回動し、弾性部材２１と第１の突起部１１の係合がはずれ、インクタンク１はインクジェット記録ユニット２から飛び出そうとするが、第２の突起部１２に弾性部材２１が係合し、インクタンク１を停止させて飛び出しを防止する。



【特許請求の範囲】

【請求項１】　インクジェット記録ユニットに対して着脱自在に保持されるインクタンクにおいて、１側面に設けられた第１の突起部と、該第１の突起部の下に配置された第２の突起部を有することを特徴とするインクタンク。

【請求項２】　前記第２の突起部の前記第１の突起部側の面は、インクタンクの底面と平行でないことを特徴とする請求項１に記載のインクタンク。

【請求項３】　インクジェット記録ユニットに対して着脱自在に保持されるインクタンクにおいて、１側面に係止用の斜面が設けられた凸部を有していることを特徴とするインクタンク。

【請求項４】　請求項１または２に記載のインクタンクを着脱自在に保持するインクジェット記録ユニットにおいて、前記インクタンクの底面に当接し前記インクタンクの保持状態を開放するように作用する反力発生部材と、前記インクタンクが装着された状態で該インクタンクの前記第１の突起部および前記第２の突起部が設けられた側面と対向するように形成され前記第１の突起部または前記第２の突起部と係合する弾性部材を有することを特徴とするインクジェット記録ユニット。

【請求項５】　前記インクタンクは底面にインクを外部に供給するための供給口を有しており、前記反力発生部材が前記供給口と結合するインクの液体連通部材を兼ねていることを特徴とする請求項４に記載のインクジェット記録ユニット。

【請求項６】　前記インクタンクが装着された状態で該インクタンクの前記第１の突起部および前記第２の突起部が設けられた側面と対向する面に、前記インクタンクの前記第１の突起部および前記第２の突起部の幅よりも広く、かつ前記インクタンクの幅よりも狭い間隔で、前記弾性部材の両側に複数本の保護リブを設けたことを特徴とする請求項４に記載のインクジェット記録ユニット。

【請求項７】　請求項３に記載のインクタンクを着脱自在に保持するインクジェット記録ユニットにおいて、前記インクタンクの前記凸部に設けられた前記斜面に当接する面が曲面で構成された突出部を有することを特徴とするインクジェット記録ユニット。

【請求項８】　前記突出部の下部に、前記インクタンクの前記凸部の一面に当接する第１のリブを設け、これと対向する面に前記インクタンクの前記凸部が設けられた側面と反対側の側面に当接する第２のリブを設けたことを特徴とする請求項７に記載のインクジェット記録ユニット。

【請求項９】　前記インクタンクを前記インクジェット記録ユニットに装着した際に前記インクタンクの底面に対して傾斜した第３のリブを設けたことを特徴とする請求項４ないし８のいずれか１項に記載のインクジェット記録ユニット。

【請求項１０】　前記インクタンクの前記凸部を有する側面あるいは前記第１の突起部及び前記第２の突起部を有する側面と直交する側面に当接する第４のリブを設けたことを特徴とする請求項４ないし９のいずれか１項に記載のインクジェット記録ユニット。

【請求項１１】　記録媒体の記録面に沿って往復移動可能に支持されたキャリッジを有するインクジェット記録装置において、請求項４ないし１０のいずれか１項に記載のインクジェット記録ユニットを有することを特徴とするインクジェット記録装置。

【請求項１２】　前記インクジェット記録ユニットが前記キャリッジと一体化されていることを特徴とする請求項１１に記載のインクジェット記録装置。

【発明の詳細な説明】

【０００１】

【発明の属する技術分野】本発明は、インクを吐出して記録媒体に記録を行なうインクジェット方式の記録装置に関するものであり、詳しくは記録用のインクを収容するインクタンク、このインクタンクを着脱自在に保持するインクジェット記録ユニット、およびこのインクジェット記録ユニットを備えたインクジェット記録装置に関するものである。

【０００２】

【従来の技術】従来のインクジェット記録装置において、インクジェット記録ユニットに対してインクタンクを着脱自在に位置決めする手段としては、弾性部材をインクタンクに設けておき、これに対応する係合部分をインクジェット記録ユニットに設け、両者を係合あるいは係合の解除により、インクタンクの着脱操作を行なわせている。

【０００３】具体的な従来の技術としては、特開平８－５８１０７号公報に示されているように、インクタンクに設けられた弾性を有するラッチレバーのラッチ爪と、インクジェット記録ユニット側に設けられた係合穴との嵌合により、インクタンクの固定を行ない、ラッチレバーの解除によりインクタンクの取り外しを行なうことが知られている。

【０００４】ところが、この弾性部材を利用したインクタンクの着脱においては、インクタンクの取り外しの際に、弾性部材の弾性力が必要以上に働いてしまうことがあり、その結果インクジェット記録ユニットよりインクタンクが弾性力によって飛び出してしまうことがあった。さらに使用済みのインクタンクがインクジェット記録ユニットより飛び出してしまうとインクタンクのインク供給口付近に残存付着していたインクが飛び散り、ユーザや記録装置、記録媒体の汚染等を招くという問題があった。

【０００５】また、装着時には、ラッチ爪と係合穴との嵌合を行なわせる際には、ラッチレバーを押下してイン

クタンクを回動させるが、この時の回動の中心軸が定まらず、装着時のインクタンクの姿勢が安定しないため、装着位置が微妙にズレてしまうなどの問題もあった。

【０００６】

【発明が解決しようとする課題】本発明は、上述した事情に鑑みてなされたもので、インクタンクを取り外す際に不必要にインクタンクを上昇させず、インクジェット記録ユニットからインクタンクが飛び出すことを防止するとともに、インクタンクの着脱をスムースにしかも確実に行なうことのできるインクタンク、インクジェット記録ユニット、インクジェット記録装置を提供することを目的とするものである。

【０００７】

【課題を解決するための手段】請求項１に記載の発明は、インクジェット記録ユニットに対して着脱自在に保持されるインクタンクにおいて、１側面に設けられた第１の突起部と、該第１の突起部の下に配置された第２の突起部を有することを特徴とするものである。

【０００８】請求項２に記載の発明は、請求項１に記載のインクタンクにおいて、前記第２の突起部の前記第１の突起部側の面は、インクタンクの底面と平行でないことを特徴とするものである。

【０００９】請求項３に記載の発明は、インクジェット記録ユニットに対して着脱自在に保持されるインクタンクにおいて、１側面に係止用の斜面が設けられた凸部を有していることを特徴とするものである。

【００１０】請求項４に記載の発明は、請求項１または２に記載のインクタンクを着脱自在に保持するインクジェット記録ユニットにおいて、前記インクタンクの底面に当接し前記インクタンクの保持状態を開放するように作用する反力発生部材と、前記インクタンクが装着された状態で該インクタンクの前記第１の突起部および前記第２の突起部が設けられた側面と対向するように形成され前記第１の突起部または前記第２の突起部と係合する弾性部材を有することを特徴とするものである。

【００１１】請求項５に記載の発明は、請求項４に記載のインクジェット記録ユニットにおいて、前記インクタンクは底面にインクを外部に供給するための供給口を有しており、前記反力発生部材が前記供給口と結合するインクの液体連通部材を兼ねていることを特徴とするものである。

【００１２】請求項６に記載の発明は、請求項４に記載のインクジェット記録ユニットにおいて、前記インクタンクが装着された状態で該インクタンクの前記第１の突起部および前記第２の突起部が設けられた側面と対向する面に、前記インクタンクの前記第１の突起部および前記第２の突起部の幅よりも広く、かつ前記インクタンクの幅よりも狭い間隔で、前記弾性部材の両側に複数本の保護リブを設けたことを特徴とするものである。

【００１３】請求項７に記載の発明は、請求項３に記載のインクタンクを着脱自在に保持するインクジェット記録ユニットにおいて、前記インクタンクの前記凸部に設けられた前記斜面に当接する面が曲面で構成された突出部を有することを特徴とするものである。

【００１４】請求項８に記載の発明は、請求項７に記載のインクジェット記録ユニットにおいて、前記突出部の下部に、前記インクタンクの前記凸部の一面に当接する第１のリブを設け、これと対向する面に前記インクタンクの前記凸部が設けられた側面と反対側の側面に当接する第２のリブを設けたことを特徴とするものである。

【００１５】請求項９に記載の発明は、請求項４ないし８のいずれか１項に記載のインクジェット記録ユニットにおいて、前記インクタンクを前記インクジェット記録ユニットに装着した際に前記インクタンクの底面に対して傾斜した第３のリブを設けたことを特徴とするものである。

【００１６】請求項１０に記載の発明は、請求項４ないし９のいずれか１項に記載のインクジェット記録ユニットにおいて、前記インクタンクの前記凸部を有する側面あるいは前記第１の突起部及び前記第２の突起部を有する側面と直交する側面に当接する第４のリブを設けたことを特徴とするものである。

【００１７】請求項１１に記載の発明は、記録媒体の記録面に沿って往復移動可能に支持されたキャリッジを有するインクジェット記録装置において、請求項４ないし１０のいずれか１項に記載のインクジェット記録ユニットを有することを特徴とするものである。

【００１８】請求項１２に記載の発明は、請求項１１に記載のインクジェット記録装置において、前記インクジェット記録ユニットが前記キャリッジと一体化されていることを特徴とするものである。

【００１９】

【発明の実施の形態】図１は、本発明のインクタンクの実施の一形態を示す側面図である。図中、１はインクタンク、１１は第１の突起部、１２は第２の突起部、１３は凸部、１４は斜面、１５は当接部、１６は供給口、１７は位置規制面、１８は取っ手である。

【００２０】インクタンク１には、図中の左側面に、第１の突起部１１と第２の突起部１２からなる２段突起が設けられている。第１の突起部１１および第２の突起部１２は、それぞれ後述するインクジェット記録ユニットの弾性部材と係合する。第１の突起部１１は、インクタンク１が装着された状態で弾性部材と係合し、インクタンク１の装着状態を維持する。また、第２の突起部１２は、インクタンク１が取り外される際に一旦係合し、インクタンク１の飛び出しを防ぐ。第２の突起部１２は、このようにインクタンク１が完全には装着されていない斜めの状態で弾性部材と係合するため、その上部は斜面となっている。また、係合面を斜面とすることによって係合部を滑りやすくし、よりスムースに係合を解除する

ことを可能としている。

【００２１】第１の突起部１１および第２の突起部１２が形成された左側面の反対側である図中の右側面には、凸部１３が設けられている。凸部１３は、インクタンク１が装着された際に後述するインクジェット記録ユニットに設けられたリブと当接し、インクタンク１の装着位置を決めるためのものである。また、その上部には斜面１４が形成されている。この斜面１４と、後述するインクジェット記録ユニットに設けられた突出部とが当接し、インクタンク１の装着時には回動の中心軸となる。

【００２２】第１の突起部１１および第２の突起部１２の上部には、当接部１５が設けられている。この当接部１５はインクタンク１が装着された際に後述するインクジェット記録ユニットに設けられたリブと当接し、凸部１３とともにインクタンク１の装着位置を決めるためのものである。ここでは凸状に形成しているが、平面等でもよい。

【００２３】位置規制面１７は、第１の突起部１１および第２の突起部１２が設けられた側面、および、凸部１３が設けられた側面と直交する他の２側面であり、図１における正面の面と、その反対側の面である。この位置規制面１７は、紙面の表裏方向の位置決めを行なうために用いられる。

【００２４】なお、インクタンク１の底面には、記録ヘッドへインクを供給するための供給口１６が設けられている。また、インクタンク１の着脱に便利なように、凸部１３が設けられた側面に取っ手１８が設けられている。

【００２５】図２は、本発明のインクジェット記録ユニットの実施の一形態における分解斜視図、図３は、同じく断面図である。図中、２はインクジェット記録ユニット、２１は弾性部材、２２は第１のリブ、２３は突出部、２４は第２のリブ、２５は保護リブ、２６は第３のリブ、２７は第４のリブ、２８は反力発生部材、３１はフィルタ、３２はジョイントブロック、３３はマニホールド、３４はヒートシンク、３５はフェイスプレート、３６はプリント基板である。ここでは、インクジェット記録ユニット２に２つのインクタンクを装着可能な構成を示している。１つのインクタンクは、例えば黒インクなど、単色のインクのみを保持するものであり、もう１つのインクタンクは複数色のインクを保持できるものであって、ここでは３色一体型のインクタンクが装着されるものとしている。もちろん、１つのインクタンクのみが装着される構成や、３つ以上のインクタンクが装着される構成であってもよい。装着されるそれぞれのインクタンクについて、以下の構成が備えられる。また、装着されるインクタンクに収容されているインクの数は１や３に限らず、２や４以上であってもよい。

【００２６】インクジェット記録ユニット２には、第１のリブ２２、突出部２３、第２のリブ２４、保護リブ２５、第３のリブ２６、第４のリブ２７等が形成されている。第１のリブ２２は、インクタンク１の凸部１３の面と当接する。また第２のリブ２４は、インクタンク１の当接部１５と当接する。これにより、図３における左右方向のインクタンク１の位置決めを行なう。突出部２３は、インクタンク１の凸部１３の上部に設けられた斜面１４と当接する。突出部２３の当接面は曲面で構成されており、斜面１４と線状に接触する。そのため、インクタンク１を装着する際の回動軸となり、円滑なインクタンク１の回動を実現する。また、インクタンク１が装着されている間、インクタンク１は反力発生部材２８による上方へ向かう力を受けているが、この突出部２３とインクタンク１の凸部１３の斜面１４との当接と、後述する弾性部材２１とによって、インクタンク１の装着状態を維持している。

【００２７】第３のリブ２６は、インクタンク１が装着された際に底面と対向する部分に設けられ、図３に示すように第１のリブ２２側が低くなるように斜めに形成されている。ユーザがインクタンク１を装着する際に、インクタンク１を斜めに挿入するが、この第３のリブ２６は、インクタンク１の斜めの状態を一定に保つ案内の役目を果たし、ユーザによるインクタンク１の着脱操作状態による影響を受けて、ガタツキ等によるインクタンクの装着不良を起こす危険性を低下させている。また、インクタンク１を取り外す際には、インクタンク１の取っ手１８が設けられている側を押し込むことにより、インクタンク１は第３のリブ２６の高い部分を支点にして回動し、反力発生部材２８による上方への力とともにインクタンク１の第１の突起部と弾性部材２１の係止を解除することができる。

【００２８】第４のリブ２７は、インクタンク１が装着された際に、インクタンク１の位置規制面１７に当接し、インクタンク１の位置を規制して、インクジェット記録ユニット２に対するインクタンク１のガタツキを防止する。これにより、インクタンク１の供給口１６との接続部でのインク流路の連通を確実に行なうことができる。

【００２９】また、インクジェット記録ユニット２には各インクタンク１に対応して弾性部材２１が設けられている。弾性部材２１は、その先端部でインクタンク１の第１の突起部１１あるいは第２の突起部１２と係合するように構成されている。インクタンク１が装着された状態では、弾性部材２１は第１の突起部１１と係合し、突出部２３とともにインクタンク１が反力発生部材２８から受ける上向きの力に対抗してインクタンク１の装着状態を維持する。また、インクタンク１を取り外す際には、インクタンク１の凸部１３が設けられている側を押し込むことにより、インクタンク１が第３のリブ２６の高い部分を支点にして回動し、反力発生部材２８による上方への力とともにインクタンク１の第１の突起部と弾

性部材２１の係止が解除する。しかし、弾性部材２１の弾性力によって、弾性部材２１はインクタンク１の第２の突起部１２と係合する。これによって、インクタンク１を取り外す際のインクタンク１の飛び出しを防止する。

【００３０】保護リブ２５は、弾性部材２１の両側に、インクタンク１の第１の突起部１１および第２の突起部１２の幅よりも広く、インクタンク１の幅よりも狭い間隔で複数本設けられ、弾性部材２１と同等以上の高さに設けられている。インクタンク１の装着時にインクタンク１の底面角部が直接弾性部材２１に当接するのを防止し、弾性部材２１を角部で引っかけて折れ曲げるなどの不具合の発生を予防している。

【００３１】インクジェット記録ユニット２には、さらに、フィルタ３１、ジョイントブロック３２、マニホールド３３、ヒートシンク３４、フェイスプレート３５などの組立体である記録ヘッド部や、記録ヘッド部と本体とを電気的に接続するためのプリント基板３６等が装着される。

【００３２】ジョイントブロック３２には、インクタンク１に収容されているインクの色数に応じて、インクタンク１と接続するためのインク導入部を有している。各インク導入部には、フィルタ３１および反力発生部材２８が設けられている。反力発生部材２８は、インクタンク１の供給口１６と接合してインクの流路を形成する。反力発生部材２８は、例えば弾性体によって形成することができる。インクタンク１の装着によってインクタンク１の供給口１６の周囲の面が反力発生部材２８に当接し、さらに押圧されて反力発生部材２８が変形し、密閉されたインク流路を構成する。結合後は、反力発生部材２８は、その弾性力によってインクタンク１を上方へ押し上げ、インクタンク１の保持状態を開放するように作用する。また、フィルタ３１は、インクタンク１が取り外された状態で付着するゴミ等をインク流路内に混入させないために設けられている。また、フィルタ３１の微小孔に形成されるインクのメニスカスによってインクを保持し、記録ヘッドに設けられたインクを吐出するためのノズルからのインクの流出を防いでいる。

【００３３】マニホールド３３には、各色のインクごとのインク流路となる凹部あるいは壁部となる凸部が形成されており、ジョイントブロック３２と接合されてインク流路が形成される。また、マニホールド３３と記録ヘッドを接続することによって、記録ヘッドへのインク流路が形成される。これらの構成によって、インク導入部から導入されたインクを記録ヘッドに供給する。

【００３４】ヒートシンク３４には、記録ヘッドが熱的に接合され、記録ヘッドで発生する熱を逃がす。また、ヒートシンク３４の表面には、記録ヘッドに電力および制御信号、記録すべき画像の信号などを供給するための配線等が設けられている。記録する画像にあわせて発熱体を駆動するための駆動回路等が設けられることもある。ヒートシンク３４上のこれらの配線と記録ヘッドは、例えばワイヤボンディングなどにより電気的に接続される。さらに、記録ヘッドを保護するため、フェイスプレート３５が取り付けられる。

【００３５】プリント基板３６は、インクジェット記録装置本体からの電力、制御信号、画信号などを各ヒートシンク３４上の配線に中継するために設けられている。インクジェット記録装置本体とフレキシブルケーブルで接続するためのコネクタと、各ヒートシンク３４上の配線と接続するための端子を有している。また、記録ヘッドの記録制御を行なうための制御回路が配置されることもある。

【００３６】インクジェット記録ユニット２には、プリント基板３６が取り付けられ、さらにそれぞれの記録ヘッド部が取り付けられる。ここで示した、インクジェット記録ユニット２は、インクジェット記録装置のキャリッジと兼用され、図示しないガイドバーに沿って被記録媒体上を移動する。あるいは、別体のキャリッジにインクジェット記録ユニット２を装着する構成であってもよい。また、記録ヘッド部は、着脱自在に構成することが可能である。

【００３７】図４は、本発明のインクジェット記録ユニットに対してインクタンクが装着される前の状態の一例を示す断面図であり、図５は、同じくインクタンクが装着された状態の一例を示す断面図、図６は、同じくインクタンクを取り外す際の中間係止状態の一例を示す断面図である。ユーザがインクタンク１をインクジェット記録ユニット２に装着しようとする際には、インクタンク１を図４に示すように凸部１３側を下げて落とし込む。このとき、インクタンク１の第１の突起部１１や第２の突起部１２が設けられている側の下部は第２のリブ２４や保護リブ２５等にぶつかり、インクタンク１は取っ手１８側に侵入方向を規制される。また、インクタンク１の底面の取っ手１８側の部分は第３のリブ２６に当接し、第３のリブ２６の傾斜に沿ってインクタンク１は取っ手１８側へと滑り込む。これにより、インクタンク１の凸部１３は、突出部２３の下に潜り込む。

【００３８】図４に示すようにインクタンク１を落とし込んだ後、ユーザはインクタンク１の取っ手１８とは反対側を押し込む。これにより、弾性部材２１はインクタンク１の第２の突起部１２、第１の突起部１１の順にこれらが設けられている側面を摺動する。このとき、弾性部材２１は保護リブ２５によって保護されているので、インクタンク１の底面に引っかかって破損することはない。また、弾性部材２１の摺動が良好に行なわれるように、第１の突起部１１および第２の突起部１２の下部はなだらかな傾斜面を有している。一方、図４における紙面の表裏方向のインクタンク１の位置は、インクタンク１の位置規制面１７と第４のリブ２７との当接によって

位置決めがなされる。

【００３９】インクタンク１を押し込んでゆくと、インクタンク１の底面の供給口１６の周囲が反力発生部材２８に当接し、さらに押し込むと反力発生部材２８が弾性変形するとともに供給口１６の周囲に密着してインクの流路を形成する。また、反力発生部材２８の弾性変形とともに、その弾性力によってインクタンク１は上方へ押し上げられる向きの力を受けるようになる。いま、インクタンク１の第１の突起部１１および第２の突起部１２が設けられている側はユーザによって押圧されているが、インクタンク１の取っ手１８が設けられている側は力が加えられていないため、こちらの側が反力発生部材２８による力によって上方へ押し上げられる。これによって凸部１３の上部の斜面１４と突出部２３の曲面とが線状に当接する。以後、この線状の当接部がインクタンク１の回動の中心となる。線状に当接しているので、以後のインクタンク１の回動はスムースである。

【００４０】さらにインクタンク１が押し込まれると、弾性部材２１と第１の突起部１１とが係合し、反力発生部材２８による上方への力を、この係合部と、凸部１３の斜面１４と突出部２３との当接によって受けて、インクタンク１を装着状態に保持する。また、当接部１５と第２のリブ２４が当接し、さらに凸部１３と第１のリブ２２が当接し、図５における左右方向の位置決めがなされる。このようにして、図５に示すようにインクタンク１がインクジェット記録ユニット２に装着される。インクタンク１の装着によって、反力発生部材２８はインクタンク１の底面に密着し、インクタンク１の供給口１６より、反力発生部材２８を介してインクをインクジェット記録ユニット２の記録ヘッドへと導く。

【００４１】インクタンク１を取り外す際には、インクタンク１の取っ手１８側を押し下げる。すると、インクタンク１の底面が第３のリブ２６の高い部分に当接するとともに当接部を軸として回動し、弾性部材２１と第１の突起部１１との係合か解除される。すると、反力発生部材２８の弾性力によって、インクタンク１の第１の突起部１１および第２の突起部１２が設けられている側が押し上げられる。弾性部材２１は、第１の突起部１１との係合が解除された後は、その弾性力によってインクタンク１の面に沿って摺動し、第２の突起部１２と当接する。第２の突起部１２の上面は斜めに形成されており、インクタンク１が斜めに回動した状態で弾性部材２１と係合する。この係合によって、インクジェット記録ユニット２から飛び出そうとするインクタンク１は停止する。そのため、反力発生部材２８の弾性力によってインクタンク１が飛び出すことはない。弾性部材２１と第２の突起部１２が係合してインクタンク１が停止した中間状態を図６に示している。

【００４２】弾性部材２１と第２の突起部１２が係合してインクタンク１が停止した後、ユーザがインクタンク１を持ち上げることにより弾性部材２１と第２の突起部１２の係合は解除され、インクタンク１を取り外すことができる。第２の突起部１２の係合面は斜面で構成されているので、弾性部材２１と第２の突起部１２の係合部は滑りやすく、スムースに係合を解除することができる。

【００４３】上述の各リブは、図面ではいずれも線状の頂部を有する凸状部として示したが、これに限らず、面状の頂部を有する凸状部として形成してもよい。

【００４４】

【発明の効果】以上の説明から明らかなように、本発明によれば、請求項１に記載の発明のようにインクタンクに第１の突起部および第２の突起部からなる２段突起を設けておき、請求項４に記載の発明のように、この第１の突起部および第２の突起部に対向してインクジェット記録ユニットに弾性部材を設け、第１の突起部あるいは第２の突起部と係合することによって、インクタンクを２段階で保持し、またその保持状態の解除を２段階で行なわせる。これにより、インクタンクを取り外す際に反力発生部材による作用によって不必要にインクタンクを上昇させることなく係止し、インクジェット記録ユニットからインクタンクを飛び出させないようにすることができる。

【００４５】なお、請求項２に記載の発明のように、第２の突起部の第１の突起部側の面を、インクタンクの底面と平行でない斜面で構成することによって、インクジェット記録ユニットの弾性部材との係合部が滑りやすくなり、スムースに係合を解除することが可能となる。また、請求項５に記載の発明のように、反力発生部材に記録用のインクの連通部材を兼ねさせることにより、少ない部材によって、インクタンクの装着時にインクタンクの供給口と記録ヘッド側とを液体連通させることが同時に可能となる。さらに、請求項６に記載の発明のように、弾性部材の両側に複数本の保護リブを設けたことによって、インクタンクの底面による弾性部材の破壊を防止することができる。

【００４６】一方、請求項３に記載の発明のように、インクタンク側に、係止用の斜面を設けた凸部を形成しておき、請求項７に記載の発明のように、インクジェット記録ユニット側にインクタンクの凸部の斜面に当接する突出部設け、突出部の当接面を曲面で構成することによって、当接部は直線状となる。そのため、インクタンクの着脱の際に、この当接部の直線を軸としてインクタンクをスムースに回動することができ、着脱が容易になる。また、請求項８に記載の発明のように、インクジェット記録ユニットに、インクタンクの凸部と当接する第１のリブを設け、これと対向する面に前記インクタンクの前記凸部が設けられた側面と反対側の側面に当接する第２のリブを設けておくことによって、第１のリブおよび第２のリブ間でインクタンクの位置決めを行ない、イ

ンクタンク装着後のインクジェット記録ユニットに対するインクタンクのガタツキを防止することが可能となり、結果としてインクの供給口部分でのインク流路の接続を確実に行なうことができる。

【００４７】請求項９に記載の発明によれば、インクタンクの底面に対して傾斜した第３のリブを設けたことによって、着脱の際に一時的に斜めの状態となるインクタンクの斜めの状態を一定に保つ案内の役目を果たし、ユーザーの着脱操作状態による影響を受けてガタツキ等によるインクタンクの装着不良を起こす危険性を低下させることができる。

【００４８】請求項１０に記載の発明によれば、インクタンクの凸部を有する側面あるいは第１の突起部及び第２の突起部を有する側面と直交する側面に当接する第４のリブを設けたので、インクタンク装着後のインクジェット記録ユニットに対するインクタンクのガタツキをこの第４のリブ間方向で防止することが可能となり、結果としてインクの供給口部分でのインク流路の接続を確実に行なうことができる。

【００４９】請求項１１に記載の発明によれば、請求項４ないし１０のいずれか１項に記載のインクジェット記録ユニットを有するインクジェット記録装置を得ることができ、特に請求項１２に記載の発明のように、インクジェット記録ユニットをキャリッジと一体化することによって、インクジェット記録装置の構成を簡素化することができる。

【図面の簡単な説明】

【図１】　本発明のインクタンクの実施の一形態を示す側面図である。

【図２】　本発明のインクジェット記録ユニットの実施の一形態における分解斜視図である。

【図３】　本発明のインクジェット記録ユニットの実施の一形態における断面図である。

【図４】　本発明のインクジェット記録ユニットに対してインクタンクが装着される前の状態の一例を示す断面図である。

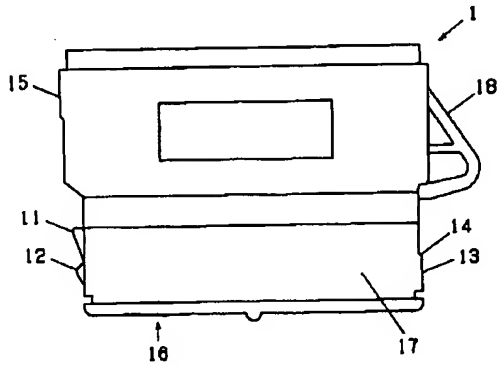
【図５】　本発明のインクジェット記録ユニットに対してインクタンクが装着された状態の一例を示す断面図である。

【図６】　本発明のインクジェット記録ユニットからインクタンクを取り外す際の中間係止状態の一例を示す断面図である。

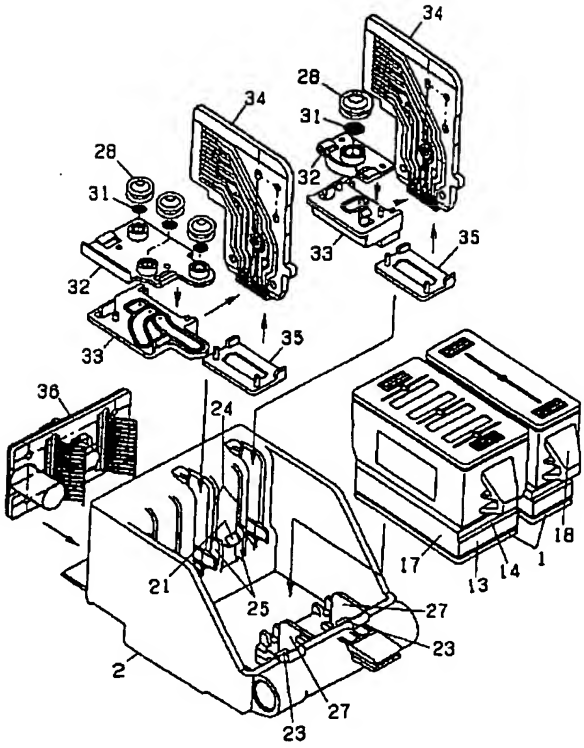
【符号の説明】

１…インクタンク、２…インクジェット記録ユニット、１１…第１の突起部、１２…第２の突起部、１３…凸部、１４…斜面、１５…当接部、１６…供給口、１７…位置規制面、１８…取っ手、２１…弾性部材、２２…第１のリブ、２３…突出部、２４…第２のリブ、２５…保護リブ、２６…第３のリブ、２７…第４のリブ、２８…反力発生部材、３１…フィルタ、３２…ジョイントブロック、３３…マニホールド、３４…ヒートシンク、３５…フェイスプレート、３６…プリント基板。

【図１】



【図２】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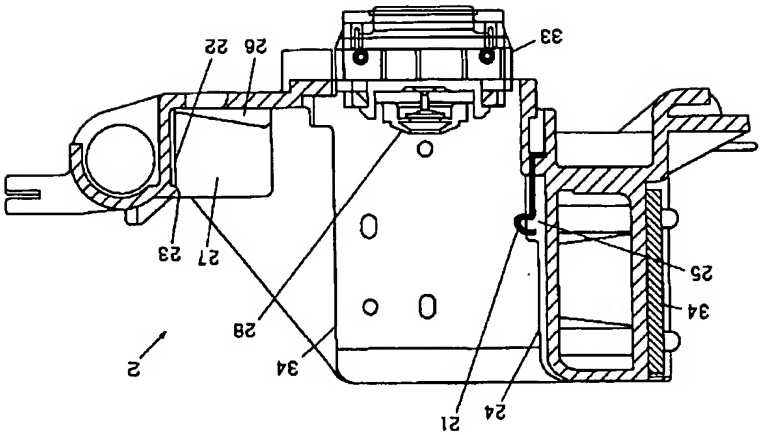
【図３】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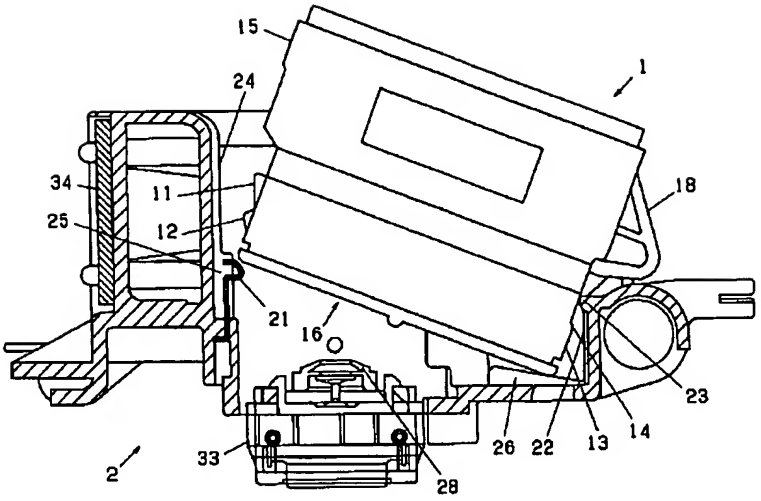
【図４】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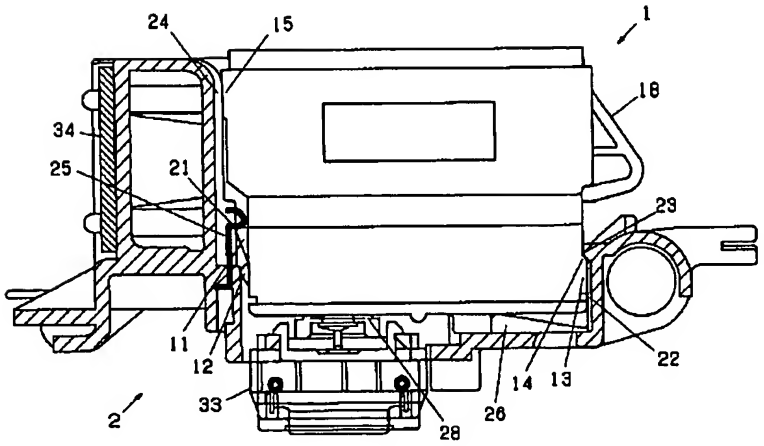
【図５】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【図６】